

CLAIMS

What is claimed is:

1. A compressor wheel comprising:
 - titanium;
 - 5 a proximate end;
 - a distal end;
 - an axis of rotation;
 - a z-plane positioned between the proximate end and the distal end; and
 - 10 a joint having an axis coincident with the axis of rotation and an end surface positioned between the z-plane and the distal end.
2. The compressor wheel of claim 1 wherein the joint is capable of receiving a balancing spindle and wherein a distal end of the balancing
15 spindle extends beyond the z-plane.
3. The compressor wheel of claim 1 further comprising a balancing spindle positioned in the joint and having a distal end that extends beyond the z-plane.
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4. The compressor wheel of claim 1 comprising a turbocharger compressor wheel.

5. The compressor wheel of claim 1 wherein the end surface of the joint comprises an ellipse.
6. The compressor wheel of claim 5 wherein the ellipse comprises a
5 radius to height ratio of approximately 3:1.
7. The compressor wheel of claim 1 wherein the compressor wheel comprises titanium alloy.
- 10 8. The compressor wheel of claim 1 wherein the joint comprises a proximate portion, an intermediate portion and a distal portion.
9. The compressor wheel of claim 8 wherein the distal portion comprises a diameter and a length of approximately 1.6 of the diameters.
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10. The compressor wheel of claim 1 wherein the peak principle operational stress of the compressor wheel occurs proximate to the end surface and proximate to the axis of rotation and does not exceed the yield stress.
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11. The compressor wheel of claim 1 wherein the end surface comprises approximately a full radius.

12. The compressor wheel of claim 1 wherein the joint is capable of receiving a compressor shaft and wherein a distal end of the compressor shaft does not extend beyond the z-plane.
- 5 13. The compressor wheel of claim 1 further comprising a compressor shaft positioned in the joint and having a distal end that does not extend beyond the z-plane.
- 10 14. The compressor wheel of claim 13 wherein the compressor shaft comprises a turbocharger shaft.
- 15 15. An assembly comprising:
a compressor wheel, the compressor wheel comprising titanium, a proximate end, a distal end, an axis of rotation, a z-plane positioned between the proximate end and the distal end, and a joint having an axis coincident with the axis of rotation and an end surface positioned between the z-plane and the distal end; and
a balancing spindle positioned in the joint and having a distal end that extends beyond the z-plane.
- 20 16. The assembly of claim 15 wherein the compressor wheel comprises titanium alloy.

17. An assembly comprising:
a compressor wheel, the compressor wheel comprising titanium, a proximate end, a distal end, an axis of rotation, a z-plane positioned between the proximate end and the distal end, and a joint having an axis coincident with the axis of rotation and an end surface positioned between the z-plane and the distal end; and
a compressor shaft positioned in the joint and having a distal end that does not extend beyond the z-plane.
18. The assembly of claim 17 wherein the compressor wheel comprises titanium alloy.
19. A turbocharger comprising:
an end opposite the distal end of the compressor shaft of the assembly of claim 17 positioned in a turbine joint of a turbine wheel.
20. A method comprising:
inserting a balancing spindle into a closed-end joint of a compressor wheel to a depth beyond the z-plane of the compressor wheel;
balancing the compressor wheel;
removing the balancing spindle; and

inserting a compressor shaft into the closed-end joint of the compressor wheel to a depth that is not beyond the z-plane of the compressor wheel.

- 5 21. The method of claim 20 wherein the step of inserting the balancing spindle to the depth beyond the z-plane includes stabilizing the compressor wheel for the balancing.